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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/541,597 | 04/03/2000 | Kenichiro Sato | Q58614 | 4840 |

7590 06/18/2002

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| EXAMINER |
|---|
| ASHTON, ROSEMARY E |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1752 | 18 |

DATE MAILED: 06/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. 09/541,597 | Applicant(s) SATO ET AL. | |
|---|---|---|---|
| | Examiner Rosemary E. Ashton | Art Unit 1752 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *21 May 2002* .

2a)☒ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-3* is/are allowed.

6)☒ Claim(s) *4-13* is/are rejected.

7)☒ Claim(s) *14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

## DETAILED ACTION

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goodall et al U.S. patent no. 6,136,499 in view of Allen et al U.S. patent no. 6,165,678. This rejection is repeated from the office action of July 23, 2001.

As shown in Examples 56 and 57 in column 49 Goodall teaches a positive photoresist composition comprising a photoacid generator and a polymer having maleic anhydride (MA) and the tert-butyl ester of norbornene (TBN) as monomers (MA/TBN) in propylene glycol monomethyl ether acetate. The MA monomer meets the limitation of formula Ib in claim 9 wherein Z2 is oxygen and the TBN monomer meets the limitation of formula II in claims 9,10 wherein Z1 forms an alicyclic bridged structure and one of R13-R16 is an acid decomposing t-butyl group and n is 0 as in formula II-A as in claim 11. Goodall teaches other monomers meeting applicant's limitation of formula II in column 5, lines 30-67.

In column 29, lines 37-40, Goodall teaches solvents used in the photoresist composition. Goodall does not teach the solvent is a mixture of solvents as claimed by applicant in claim 9 or the addition of a base as in claims 12 and 13.

Allen teaches a photoresist composition comprising a polymer having alicyclic pendant groups and a photoacid generator. In column 10, lines 10-35 Allen teaches eight solvents, including propylene glycol monomethyl ether acetate, ethyl lactate and butyl acetate, and states

solvent mixtures of the listed solvents may be used. A preferred solvent mixture is propylene glycol monomethyl ether acetate and ethyl lactate. Propylene glycol monomethyl ether acetate is one of the solvents added to claim 9 in the amendment filed May 21, 2002.

In column 10, lines 48-64 Allen teaches acid diffusion controlling agents such as a nitrogen basic compounds comprising those claimed by applicant in claim 13 such as pyrimidine and diazabicycloundecenes.

It would have been obvious to one of ordinary skill in the art to use a mixture of solvents, such as propylene glycol monomethyl ether acetate and ethyl lactate, for the photoresist solvent of Goodall with a reasonable expectation of obtaining a successful resist composition because Allen teaches a preferred solvent mixture for an alicyclic polymer is propylene glycol monomethyl ether acetate and ethyl lactate.

As to claims 12 and 13 it is well known in the art that chemically amplified photoresists benefit from the addition of basic reagents that limit diffusion of the acid generated during resist exposure thus it would have been obvious to one of ordinary skill in the art to add a basic nitrogen compound, such as pyrimidine or a diazabicycloundecene, to the resist composition of Goodall with a reasonable expectation of obtaining a successful resist composition because Allen teaches these compounds stabilize the composition and control acid diffusion of the acid in the composition. The motivation to combine the art is to obtain a pattern having improved pattern resolution over a composition not containing the basic compound.

3. Claims 4-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goodall et al cited above in view of Allen et al cited above and Aoai et al U.S. patent no. 5,824,451. This rejection is repeated from the office action of July 23, 2001.

As shown above Goodall teaches a positive photoresist composition comprising a photoacid generator and a polymer having maleic anhydride (MA) and the tert-butyl ester of norbornene (TBN) as monomers (MA/TBN). The MA monomer meets the limitation of formula Ib in claim 4 wherein Z2 is oxygen and the TBN monomer meets the limitation of formula II in claims 4,5 wherein Z1 forms an alicyclic bridged structure and one of R13-R16 is an acid decomposing t-butyl group and n is 0 as in formula II-A as in claim 6. Goodall teaches other monomers meeting applicant's limitation of formula II in column 5, lines 30-67.

Goodall does not teach the resist composition comprises a surfactant as in claim 4 or addition of a nitrogen base as in claims 7 and 8.

The use of surfactants in photoresist compositions is well known in the art as shown in the teaching of Allen which in column 10, lines 4-10, lists the well known "customary additives" in resist compositions such as "dyes, sensitizers, additives used as stabilizers and acid-diffusion controlling agent, coating aids such as surfactants or anti-foaming agents, adhesion promoters and plasticizers". Allen teaches surfactants are used to control coating uniformity (col. 10, lines 64-65).

Aoai also teaches the resist "customary additives" and list surfactants of commercially available fluorine and silicon containing surfactants in column 63, lines 14-42.

It would have been obvious to one of ordinary skill in the art to add a fluorine or silicon containing surfactant to the resist composition of Goodall comprising the MA/TBN copolymer with a reasonable expectation of obtaining a successful resist composition because Allen teaches the addition of surfactant provides for a more uniform coating of the resist than without the surfactant.

As to claims 7 and 8 it is well known in the art that chemically amplified photoresists benefit from the addition of basic reagents that limit diffusion of the acid generated during resist exposure thus it would have been obvious to one of ordinary skill in the art to add a basic

nitrogen compound, such as pyrimidine or a diazabicycloundecene, to the resist composition of Goodall with a reasonable expectation of obtaining a successful resist composition because Allen teaches these compounds stabilize the composition and control acid diffusion of the acid in the composition. The motivation to combine the art is to obtain a pattern having improved pattern resolution over a composition not containing the basic compound.

***Allowable Subject Matter***

4. Claims 1-3 are allowed.

The following is an examiner's statement of reasons for allowance: The prior art does not teach a positive photoresist composition having the copolymer claimed and a compound that decomposes under the action of an acid to generate sulfonic acid. The closest prior art is Maemoto et al U.S. patent no 6,017,677 which teaches a positive photoresist composition comprising a polymer having pendant functional groups which generate sulfonic acid under the influence of acid.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

5. Claim 14 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter: The prior art does not teach addition of a third solvent as claimed.

6. The request filed on May 21, 2002 for a Continued Prosecution Application (CPA) under 37 CFR 1.53(d) based on parent Application No. 09/541,597 is acceptable and a CPA has been established. An action on the CPA follows.

7. This is a CPA of applicant's earlier Application No. 09/541,597. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rosemary E. Ashton whose telephone number is 308-2057. The

examiner works a flexible work schedule and can normally be reached M-F between 10:00 am and 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet Baxter can be reached on 308-2303. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0661.

Rosemary E. Ashton
Primary Examiner
Art Unit 1752

rea
June 14, 2002

ROSEMARY ASHTON
PRIMARY EXAMINER